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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/538,275 | 06/10/2005 | Elstan Anthony Fernandez | 1890-0257 | 9417 |
| 7590 | | 06/04/2007 | | |
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| | | | HARRISON, MONICA D | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|---------------------------------------|---|--|
| Office Action Summary | Application No. 10/538,275 | Applicant(s) FERNANDEZ ET AL. | |
| | Examiner Monica D. Harrison | Art Unit 2813 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicant's amendment filed 11/15/06 has been entered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 16-19, 21, 22, 29 and 31-33 are rejected under 35 U.S.C. 102(b) as being anticipated by Thummel (6,117,382).

2. Regarding claim 16, Thummel discloses a method of packaging integrated circuits comprising: attaching a first integrated circuit (Figure 1, reference 52A) to a first face of a substrate (Figure 1, reference 18A) with electrical connection between corresponding contacts of the substrate and the first integrated circuit (Figure 2, reference 54A); attaching a second integrated circuit (Figure 1, reference 52B) to a second face of the substrate (Figure 1, reference 18B) with electrical connection between electrical contacts of the substrate and the second integrated circuit (Figure 1, reference 54B); and encasing the first and second integrated circuits in resin (Figure 1, references 30 and 40).

3. Regarding claim 17, Thummel discloses wherein the substrate includes holes extending between the first face and the second face (Figure 1, reference 60), the encasing step includes applying the resin to a first side of the substrate and flowing the resin through the holes to the second side of the substrate, whereby the resin forms a single resin body encasing both of the integrated circuits (Figure 1, references 24 and 34).

4. Regarding claim 18, Thummel discloses before said encasing step, attaching a box to the second side of the substrate defining a volume for receiving the resin (Figure 1, references 12 and 14).

5. Regarding claim 19, Thummel discloses wherein the box includes openings defining exit paths for gas within the box (Figure 1, references 28 and 38).

6. Regarding claim 21, Thummel discloses wherein the substrate is laminar (Figure 5, reference 60) and at least the first face includes solder balls (Figure 5, references 62A and 62B), the encasing step includes forming the resin on the first face such that the resin on the first face has a maximum distance from a plane of said substrate which is smaller than a maximum extension of the solder balls from the plane of the substrate (Figure 5, references 12 and 14; *resin is located inside mold cavities*).

7. Regarding claim 22, Thummel discloses wherein the solder balls are arranged in an array having a region without solder balls, and further comprising locating the first integrated circuit in said region (Figure 5, references 62A and 62B; *BGA*).

8. Regarding claim 29, Thummel discloses an integrated circuit package comprising a substrate including electrical contacts and integrated circuits attached to opposite sides of the substrate (Figure 1, references 18A and 18B), the electrical contacts electrically connected to corresponding electrical contacts on the substrate (Figure 1, references 54A and 54B), each of the integrated circuits being encased in resin (Figure 1, references 12 and 14).

9. Regarding claim 31, Thummel discloses wherein the electrical contacts of at least one of the integrated circuits are connected to the electrical contacts on the substrate by wire bonding (Figure 1, references 54A and 54B).

Art Unit: 2813

10. Regarding claim 32, Thummel discloses solder balls are arranged on at least a first side of the substrate (Figure 5, references 62A and 62B).

11. Regarding claim 33, Thummel discloses wherein the solder balls are arranged in an array having a region without solder balls, and wherein the first integrated circuit is located in said region (Figure 1).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 20 and 23-26, 30, 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thummel (6,117,382) in view of Hotta et al (5,912,320).

12. Thummel discloses all above claimed subject matter except a molding operation being performed at a pressure of less than one atmosphere (claim 20), flip chip (claims 23-25, 34 and 35), the electrical contacts of the circuits are connected to electric contacts on the substrate by wiring (claim 26) and passing resin through holes in the substrate (claim 30)

Hotta et al discloses a molding operation being performed at a pressure of less than one atmosphere (column 9, lines 18-25), flip chip (column 8, lines 11-21), the electrical contacts of the circuits are connected to electric contacts on the substrate by wiring (column 8, lines 39-55) and passing resin through holes in the substrate (column 9, lines 4-11).

It would have been obvious, at the time the invention was made, for one having ordinary skill in the art, to modify Thummel with the teachings of Hotta et al, for the purpose of a creating resin encapsulated semiconductor device.

Claims 27 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thummel (6,117,382) in view of Hotta et al (5,912,320).

13. Regarding claim 27, Thummel discloses a substrate, comprising: a plurality of first contacts and a first face configured to attach to a first integrated circuit with electrical connection between the first contacts and the first integrated circuit (Figure 1, reference 18A); a plurality of second contacts and a second face configured to attach to a second integrated circuit with electrical connection between the second contacts and the second integrated circuit (Figure 1, reference 18B); wherein the substrate defines a plurality of holes (Figure 5, references 64 and 66) extending between the first face and the second face, the substrate is laminar (Figure 5, reference 60), and at least one of the faces includes solder balls (Figure 5, references 62A and 62B).

However, Thummel does not disclose the holes passing resin through the substrate.

Hotta et al discloses holes passing resin through the substrate (column 9, lines 4-11).

It would have been obvious, at the time the invention was made, for one having ordinary skill in the art, to modify Thummel with the teachings of Hotta et al, for the purpose of a creating resin encapsulated semiconductor device.

14. Regarding claim 28, Thummel discloses wherein the solder balls are arranged in an array having a region without solder balls, and wherein said region is configured to receive the first integrated circuit (Figure 5, references 62A and 62B; *BGA*).

Response to Arguments

15. Applicant's arguments with respect to claims 16-35 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Monica D. Harrison whose telephone number is 571-272-1959. The examiner can normally be reached on M-F 7:00am-3:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Monica D. Harrison
AU 2813

mdh
May 29, 2007


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